Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at http://about.jstor.org/participate-jstor/individuals/early-journal-content.

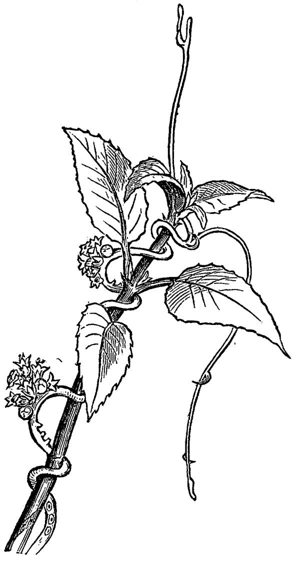
JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

This is one of the most common species of snail in New England, though occurring only in certain localities; it generally occurs in great numbers. It is found in forests, and sometimes in open fields in damp situations. On islands they often occur in the greatest profusion. When in captivity, they lie buried most of the time under the moist earth, and appear to suffer more from the want of moisture than other species.—*To be continued.*

PARASITIC PLANTS.

BY G. D. PHIPPEN.

Fig. 1.



To persons familiar with the principles of cultivation, and with more or less knowledge of our native plants, the fact that there are tribes of plants in other regions of the earth, that, without any attachment whatever to the soil, grow and produce flowers of the most novel form and brilliancy of colors, seems wonderful in the extreme. Such are the Epiphytes, or air-plants of the tropics, whose seeds, lodging on the branches of living or decayed trees, or even upon the very rocks, readily vegetate, and draw from the surrounding atmosphere the constituents of their growth.

This is accomplished chiefly through their roots, as in other plants; and as they are found to increase with much greater luxuriance in the recesses of the forest, by the banks of streams, in a sultry, humid atmosphere, we see less difficulty in comprehending the possibilities of their growth and the economy of their being; indeed, their nature is now so well understood, that they are cultivated with ease in our conservatories.

We do not, however, intend to write of air-plants, as our country produces none; but we have, among our native plants, those whose methods of growth are perhaps scarcely less novel and wonderful; such as our parasites, which derive their nourishment from other living plants to which they adhere,—depending upon the leaves and roots of such plants for the necessary contact with the atmosphere and the soil.

The name Parasite is of great significance, for such plants are robbers in the fullest sense, and live solely at the expense of their neighbors.

The most marked example in this region of such anomalous plants is the Dodder. Our species, the Cuscuta Gronovii (*C. umbrosa* Torrey, or *C. vulgivaga* Englemann) is as strongly marked, and more widely distributed than either of the other American species.

The genus Cuscuta has generally been appended to the Convolvulaceæ, or the Convolvulus tribe, which consists chiefly of twining plants, and have regular monopetalous pentandrous corollas, and two to four-celled capsules, with large seeds. This order is well represented by the Cypress vine and the Morning-glory.

The Cuscutas have no leaves, for these plants need none; all the necessary functions of leaves, as has been stated, being performed by the leaves of other plants on which they grow. They have, however, a few minute scales in alternate succession, which are in place of leaves, and from their axils spring the branches. (See Fig. 1.) Although so anomalous as these plants are supposed to be, yet the right of being perfect plants must be conceded them, and they are properly assigned a place with other Convolvuli.

Eight or nine species grow freely in this country, two of which are found in New England.

C. epilinum, or the Flax Dodder of the old world, mentioned by Gerard and more ancient writers, is naturalized here to some extent. It is said to grow only upon flax, to which it is a great pest, spoiling large quantities. It was noticed by Dr. Cutler as being destructive in his time; but as that useful plant is now seldom cultivated in this region, the Flax Dodder is but rarely detected. A monograph of the American species, prepared by Dr. George Englemann, of St. Louis, can be found in Silliman's Journal, vols. 43, p. 333, and 45, p. 73.

Under the name *C. Americana*, the various native species were for a long time confounded. The botanical text-books tell us that the seeds of this strange plant germinate in the earth in the ordinary manner, throwing downward a root into the soil, by which for a short time the tender plantlet is sustained, until it elongates its thread-like stem sufficiently to reach some foster-plant, around which it immediately twines, and into whose tender bark it thrusts aerial roots, which feed upon its juices; after which, no longer needing attachment to the soil, the primitive root withers away.

After many times plucking the cord-like stems of this plant, and noticing the decisive development of its flowers and seed (for they are as perfect as upon leaf-clad plants), we resolved to prove, with our own eyes, its double nature and singular method of growth. Accordingly we procured some perfect seed of which the wild plant produces an abundance, and of a size by no means diminutive, and planted them in a bed with other seeds, in small rows, each appropriately tallied, and all designed for transplanting, in due time, to suitable places in the border. In a very few days after planting, the Cuscuta-seed uncoiled its feeble embryo, and erected its simple yellow thread into the sunshine and air; but while we waited for further developments, the spring winds and the warm suns of noon quickly withered them away.

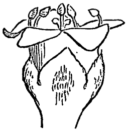
Thus our first attempt at cultivation utterly failed, and solely for the want of some older plants in sufficient proximity for the young seedlings to cling to, but which at the time escaped our reflection. Months elapsed before the experiment was again tried, which was done within doors and in mid-winter with perfect success. The seed readily germinated as before, and when the young plants were about an inch in height, they were taken separately from the earth, and placed here and there on the axils of the leaves of plants near at hand, such as Fuschias, Geraniums, and sundry hanging plants.

With the instincts of their nature (if it be pardonable to use that term), they in a few days attached themselves to these plants, particularly to the Fuschias; and as the spring advanced, they grew with great luxuriance and flowered freely, but, as might be supposed, to the manifest detriment of the plants about which they twined. This, however, was overlooked in the satisfaction arising from success; for had their yellow stems been gold, and their clusters of flowers pearls, the satisfaction would hardly have been greater. Those placed on the hanging plants, although they adhered, made but feeble growth.

One seedling placed upon a plant of *Dielytra spectabilis* did not twine or extend itself with much freedom, but, taking a turn or two near the extremity of one of the branches, it there expended its strength in perfecting a large conglomerate cluster of one hundred or more bells of unusual size and purity of color. In the process of transplanting from the earth to their aerial abode, we at first attempted to convey a ball of earth with each seedling, but this was soon found to be worse than useless.

C. Gronovii, the species under consideration, is found in low damp places, and by the side of brooks and ponds, twining and climbing over such plants as the Willow and Cephalanthus, Decodon and Lythrum, Solidago and Impatiens, to which it attaches itself by "tuberculous processes" or "radicating papillæ," as its roots or suckers, under the partial knowledge of their nature, have hitherto been called. This plant grows often to the length of five or six feet, with its branching, leafless stems, considerably resembling tangled cord, and are of a deep yellow or orange color, being thickly studded with cymose clusters of small white bell-shaped flowers, somewhat like those of the Lily of the Valley, but much more diminutive. We have seen this plant growing on the banks of Ipswich River and its brooklets, in great luxuriance, stretching far over the water upon the deeply-immersed stems of the Button-bush and Decodon.

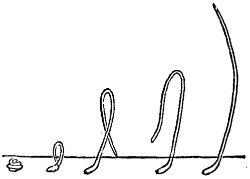
Fig. 2.



This species of Cuscuta does not appear to have any partiality to particular species of foster-plants, but freely attaches itself to such as grow within its reach (Fig. 2). Its flowers, or little globose bells, consist of short five-lobed tubes, with calices similarly divided, and five stamens inserted between the lobes of the corolla, upon peculiar scaly fringes, not visible in the drawing, which are an expansion of the filaments of the stamens.

The seed contains a filiform embryo, without cotyledons, lying spirally coiled in fleshy albumen, and is distinctly discernible while the seed is in a green state; and here we see written, in the spiral form of the dormant embryo, a prediction of the character of the future plant. In the process of germination this embryo simply uncoils itself; one end as a radicle strikes downward into the soil, while the other, as a plumule, rises from the earth, first breaking ground in the form of a loop, then when the point becomes disengaged resembling a fish-hook, and finally appearing quite straight in its effort to reach some friendly support (Fig. 3).

Fig. 3.

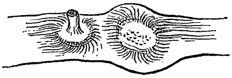


It is generally represented in plates as rising in a spiral form, as also are the branches of the older plants, but this form is not manifest while the unsupported thread is stretching upward for succor, as if attracted by some neighboring object; it is only when the stem is obstructed, or when it reaches the coveted prop, that the spiral form is assumed, and then it becomes very quickly apparent. This is probably true of all twining plants. We have seen the tendril of a squash vine rolled into a perfect ball, when beat by the wind against a stone-wall, the irregularity of whose surface it in vain tried to grasp; while others upon the same plant, not meeting with obstruction, were nearly straight.

The radicle, which is club-shaped, is often turned up in form like a boot; it never increases in size, or ramifies in the ground, but is sufficiently absorbant to keep the young plant alive for some time, but not enough so to add materially to its primitive development. If at this time a young plant be pulled from the earth, and laid upon its surface, or placed upon some other plant, it will live many days without attachment; and here we see a wise provision of nature, adapted to the peculiar circumstances in the infancy of the plant.

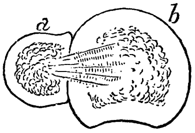
Generally, on the fourth or fifth day after the feeble seedling has been placed upon its guardian branch, it will make one turn around the stem, and the tubercles will immediately appear on the inner side of the twining part, and, after a few more days have passed, the work of absorption will commence. These tubercles, as they grow quite near together along the stem, bear a superficial resemblance to the feet of caterpillars. (See Fig. 1.) Under the microscope each one, in its early stages of development, appears to be composed of a circle of smaller prominences, which finally unite in forming one root or sucker. As the plant continues to twine, these papillæ rapidly multiply wherever the stem closely touches other living tissue, and they are found to unite readily even on other parts of its own stem; they often incipiently form along the inner side of the vine, when at a considerable distance from contact. After passing many of these papillæ under the microscope, we at last detected the manner of attachment and the character of the union.

Fig. 4.



From the depression in the centre of the above-described circle of swollen cells, a very manifest horn-like process protrudes, and inserts itself into the tissues of the foster plant, and rapidly unites with it (Fig. 4). Where the supporting stem is succulent, this root plunges far beyond the cuticle, even into the very pith of the plant, and soon forms a perfect graft (Fig. 5). The cells of the parasite can be traced deeply imbedded, until lost at the margin, among the cells of the guardian plant, which is thenceforth compelled to support the vine to fruition,—expanding its flowers, and perfecting its numerous progeny of seeds. Though these aerial roots (which are the only true roots the plant has), are thus seen to penetrate to a considerable depth, their union is of such a character, and the absorption and assimilation of the two classes of cells so gradual and complete, that no manifest swelling of the tissues of either plant in contact is visible.

Fig. 5.



When grown within doors, the plant is somewhat green, and does not take on that deep orange color, so general in its native state.

Such are a few observations that this humble plant has afforded. It merits farther investigation, and, in the economy of its nature, is as worthy an object of study as the venerated oak, or the tree that yields us fruit.

Among our wild plants are to be found many others of a parasitic nature. With but a passing allusion to the lichens, fungi, and mosses, many of which grow by attachment to other plants, and are more or less Epiphytic in character, we proceed to notice a peculiar tribe of abnormal plants, that however much they may resemble fungi in certain aspects of their being, yet, as they have flowers and fruit conformable to those of the highest organization, will ever maintain a place among true phænogamous plants, such as Beech Drops,—Epiphegus, and different species of Orobanche,—whose seed are said to germinate only in contact with the roots of beech, or other favorite of the particular species. In the subdued light of the forest, these verdureless plants elevate their brown and yellow stems, covered with scales instead of leaves, but having perfect flowers.

The Monotropa,—Indian pipe or Pine-sap,—more fungus-like still, holds a rightful place among the Pyrolaceæ, or Heaths, and with its clusters of white or tawny stems, each crowned with a large distinct flower, grows from the decayed roots and leaves of the oak and pine.

It has also been found that sundry leaf-bearing genera, situated at no great remove from the Orobanchæ are more or less parasitic upon the roots of other plants; and it is probably from this cause that the Castilleja, or painted cup, the Gerardias, and Pedicularis are so difficult, or so nearly impossible to cultivate. We have often transplanted them from their native wilds to the garden, and have as often met with disappointment. An English species of Comandra, similar to our Thesium umbellatum, whose fascicles of flowers remind one of diminutive bunches of white lilacs, is also said to form parasitic attachments upon the roots of trees.

OYSTER CULTURE.

BY F. W. FELLOWES.

BEYOND dispute or question, the French government has taken the lead of all the world in the scientific propagation and skilful culture of the oyster. For the past six years, the great discovery by the distinguished French savan, Professor Coste, of the mode of reproduction of this mollusk, has been converted to practical use; and in suitable localities on the western coast of France, imperial farms, or *parcs*, as they are called, have already